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REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF CHARLESTON

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U.S. DEPARTMENT OF COMMERCE
Maritime Administration

REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF CHARLESTON

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U.S. DEPARTMENT OF COMMERCE
ROGERS C. B. MORTON, SECRETARY

John K. Tabor
Under Secretary

Maritime Administration,
Robert J. Blackwell,
Assistant Secretary for
Maritime Affairs

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FOREWORD

The Maritime Administration, through the programs of the Office of Port and Intermodal Development, is fostering the continued growth of intermodalism within the American Merchant Marine. It is recognized that the interface of marine terminal operations with those of the rail carriers is a key to improving the effectiveness of the intermodal transport system. Reducing the cost, time, and distance factors involved in the interface between U.S.-flag carriers and inland modes can contribute to the efficiency and economy of intermodal transport, and thereby further enhance the competitiveness of the American Merchant Marine.

It is hoped that these reports will shed helpful light on the nature, procedures, and problems of container interchange, and will contribute toward the eventual refinement of this operation interface.

The Office of Port and Intermodal Development and the Eastern Region Office welcome inquiries regarding these reports and other ongoing efforts of the Maritime Administration in the field of commercial development and the promotion of the American Merchant Marine.

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INTRODUCTION

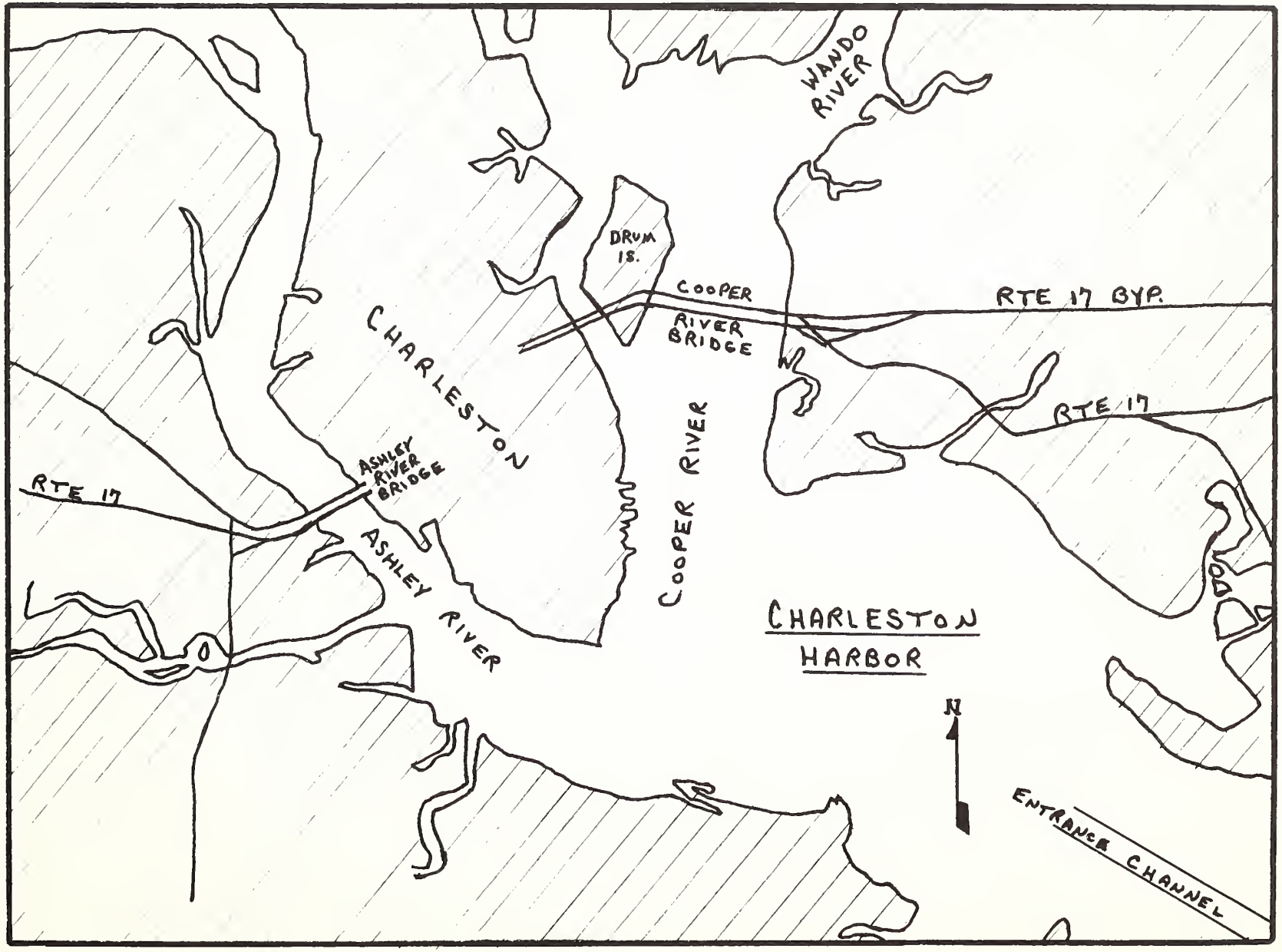
This publication continues a series of reports which examine the rail terminal/marine terminal interchange of intermodal equipment at major U.S. seaports. It concentrates on the operations of U.S.-flag steamship companies, but discusses port terminal facilities, both rail and marine, used by all ocean liner carriers serving the port of Charleston.

Charleston, S.C., is situated on a peninsula formed by the confluence of the Cooper River on the east and the Ashley River on the west. The bay into which these rivers empty is Charleston Harbor, and constitutes one of the major seaports on the east coast of the United States. Access to the ocean is via a dredged channel, 35 feet in depth, which extends from the sea to a point on the Cooper River almost 22 miles from the harbor entrance. A second channel, 30 feet in depth, branches off the main channel in mid-harbor, and extends northwesterly up the Ashley River.

Charleston, through the South Carolina State Ports Authority, is nearing completion of a diversified long-range port improvement program totalling almost $38.5 million. Upon completion, a second port development program estimated to cost $68 million will commence.

Such modernization is definitely justifiable as far as container facility development is concerned. During 1973, a total of 52,997 40-foot equivalent containers moved through Charleston. This volume grew to 70,589 40-foot equivalents in 1974, an increase of about 34 percent. There were approximately 200 pure container vessel calls at the port during 1974 which accounted for the bulk of the container movement volume.

In 1974, a total of 1,919,873 tons of general cargo moved through Charleston, of which 916,811 tons, or 47.8 percent, was containerized. This is certainly an impressive testimonial to the importance of containerization to port operations. Inland transportation to and from the port area offered by two major railroads and over three dozen motor carriers efficiently support this intermodal growth and help insure Charleston's future as an important marine container seaport.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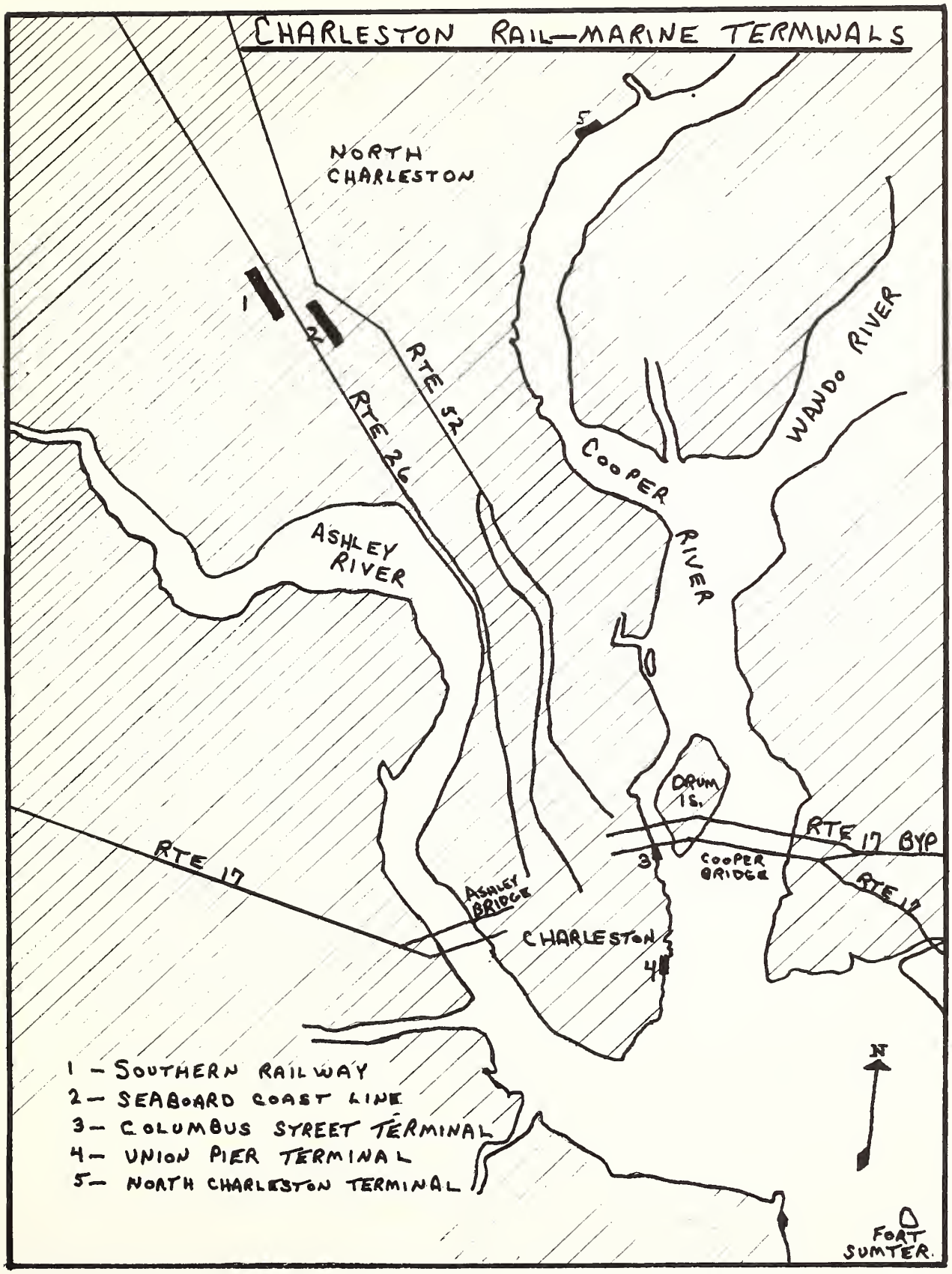
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1 — SOUTHERN RAILWAY
2 — SEABOARD COAST LINE
3 — COLUMBUS STREET TERMINAL
4 — UNION PIER TERMINAL
5 — NORTH CHARLESTON TERMINAL
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RAILROAD TERMINAL SURVEY

Southern Railway and Seaboard Coast Line, two major trunk line railroads, serve the Port of Charleston. These services are supplemented by a local rail network of switching trackage which interconnects trunk line terminals and marine terminals. The services, practices, and facilities of each are examined as they relate to railroad piggyback operations. Nearly all of the piggyback traffic of the Southern Railway in the Charleston area consists of marine container movements. Seaboard Coast Line, on the other hand, records an approximate 70 percent/30 percent marine container/domestic trailer ratio in its total Charleston piggyback traffic. Rail terminal methods of handling piggyback traffic vary, depending on whether movements are trailer-on-flatcar (TOFC), container-on-flatcar (COFC), or some combination of the two.

The port charts included as part of the introduction, should be used as a reference to determine the relative locations of the rail terminals under discussion.

SOUTHERN RAILWAY

Southern Railway offers direct rail access to all of the southern states from Charleston and to hinterland points as far west as Memphis and St. Louis. The Charleston terminal, known as Seven Mile Yard, is located approximately seven and one-half miles northwest of the downtown area. Two trains arrive each day, one from Columbia and one from Charlotte/Spartanburg. There are also two daily departures, one to each of these same inland locations. These inland terminals serve as connecting points for trackage throughout the entire Southern Rail System. Railcars are consolidated for inbound trains to Charleston, while outbound Charleston trains are broken down, and railcars are classified and routed according to ultimate destinations.

A rubber tire mounted transtainer is the principal method of handling trailers and containers in the yard. The transtainer system is somewhat standard throughout the Southern rail network and, in the case of Charleston, services tracks with a capacity of 22 TTX or TTAX railcars. Its rate of mounting or demounting containers or trailers is approximately one unit per 90 seconds. Supplementing this system is a ramp adjacent to tracks having a capacity of five rail cars.

Seven Mile Yard is normally the commencement or termination point for the inland rail haul of marine containers. However, the company has declared North Charleston Terminal to be a "ramp location" and will deliver export containers to that terminal for an additional charge of $24.39 per unit. No other marine terminals in Charleston have been designated "ramp locations" by Southern Railway.

SEABOARD COAST LINE RAILROAD

The extensive trackage of the Seaboard Coast Line Railroad (SCL) completes Charleston's rail access to the southern states. SCL's service to all of Florida is especially important since Southern offers service to only the northern third of that particular state. Bennett Yard, Seaboard Coast Line's Charleston Terminal, is situated in the same locale as Southern's yard, thus giving it comparable distances to the port's marine terminals. Two trains arrive and two depart daily, all with either origins or destinations in Florida. These trains pick up or drop off railcars at numerous locations enroute.

The railyard has both COFC and TOFC handling capability through the use of a Le Tourneau Westinghouse sideloader, as well as one ramp.

Up to 38 TTX or TTAX railcars can be spotted for working on the series of three tracks laid out in the yard for that purpose. Also maintained is a small fleet of yard commandos to shuttle trailers within the rail terminal.

Both North Charleston and Columbus Street Terminals have been designated "ramp locations" by SCL, which will deliver containers to those marine facilities for an additional cost of $24.39 per unit over the charges for the line haul movement.

SOUTH CAROLINA PUBLIC RAILWAYS COMMISSION

Rail switching services in Charleston are performed by the South Carolina Public Railways Commission. Originally owned and operated by the South Carolina State Ports Authority, the commission was re-established as a separate state agency in August of 1973. Its status, as far as the Interstate Commerce Commission is concerned, is that of a Class II Common Carrier. Operationally, and for tariff purposes, two subsidiaries are operated by the Commission.

1) Port Utilities Commission of Charleston

The Port Utilities Commission of Charleston furnishes rail switching service between major trunk line railroad terminals and marine terminals located in downtown Charleston. In that capacity, it serves the Columbus Street and Union Pier Terminals, both of which are discussed in the marine terminal section of this report.

2) Port Terminal Railroad of South Carolina

The Port Terminal Railroad of South Carolina serves the North Charleston Terminal. Its operations will also be discussed in the marine terminal survey section.

The two subsidiary rail switching carriers do not have piggyback ramps or mechanical lifting equipment to provide service for domestic trailers or marine containers. They can provide only boxcar and flatcar service at this time. The payment of switching charges for boxcar freight handled by the terminal carriers is generally absorbed by the railroad having the line hauls.

MARINE TERMINAL SURVEY

The port of Charleston has three general cargo and container marine terminals, all of which are owned and operated by the South Carolina State Ports Authority. This section of the report examines each of these facilities with respect to:

1) Geographical Location

2) Owner, Operator, Tenant Information

3) Highway Access

4) Railroad Access

5) Facility Description

6) Traffic Volume

Two of the terminals, Columbus Street and Union Pier, are situated on the Cooper River, approximately seven to eight nautical miles from the open sea. Further up the Cooper River in North Charleston, about 17 nautical miles from open water, lies the North Charleston Terminal. Reference should be made to the port charts, included as part of the introduction, in order to ascertain the relative locations of the marine terminals with respect to rail terminals and other port features.

COLUMBUS STREET TERMINAL

Situated almost directly beneath the Cooper River Bridge, over which passes U.S. Route 17, is the Columbus Street Terminal, a public facility which handles both breakbulk and containerized freight. Among the major vessel operator tenants are Sea-Land Service, Moore-McCormack Lines, Farrell Lines, Prudential Lines, United States Lines, and United Brands, Inc.

Because of its location adjacent to Route 17, which in turn interconnects with several other major highways in the area, the terminal has excellent vehicular accessibility. Rail access to both major trunk line rail carriers, the Southern Railway and the Seaboard Coast Line, is via the rail switching services of the Port Utilities Commission of Charleston. As discussed previously, these services are only available for breakbulk cargo.

Vessel berthing at Columbus Street Terminal is along a 3,875 foot continuous concrete marginal wharf, the longest in the entire port. Constructed along the wharf's apron is transit and warehouse space totalling 527,000 square feet, all with water sprinkler protection. The cranes which service both the breakbulk and container operations of the facility are as follows:

A) One Diamond 75-ton rail mounted crane with container handling capability

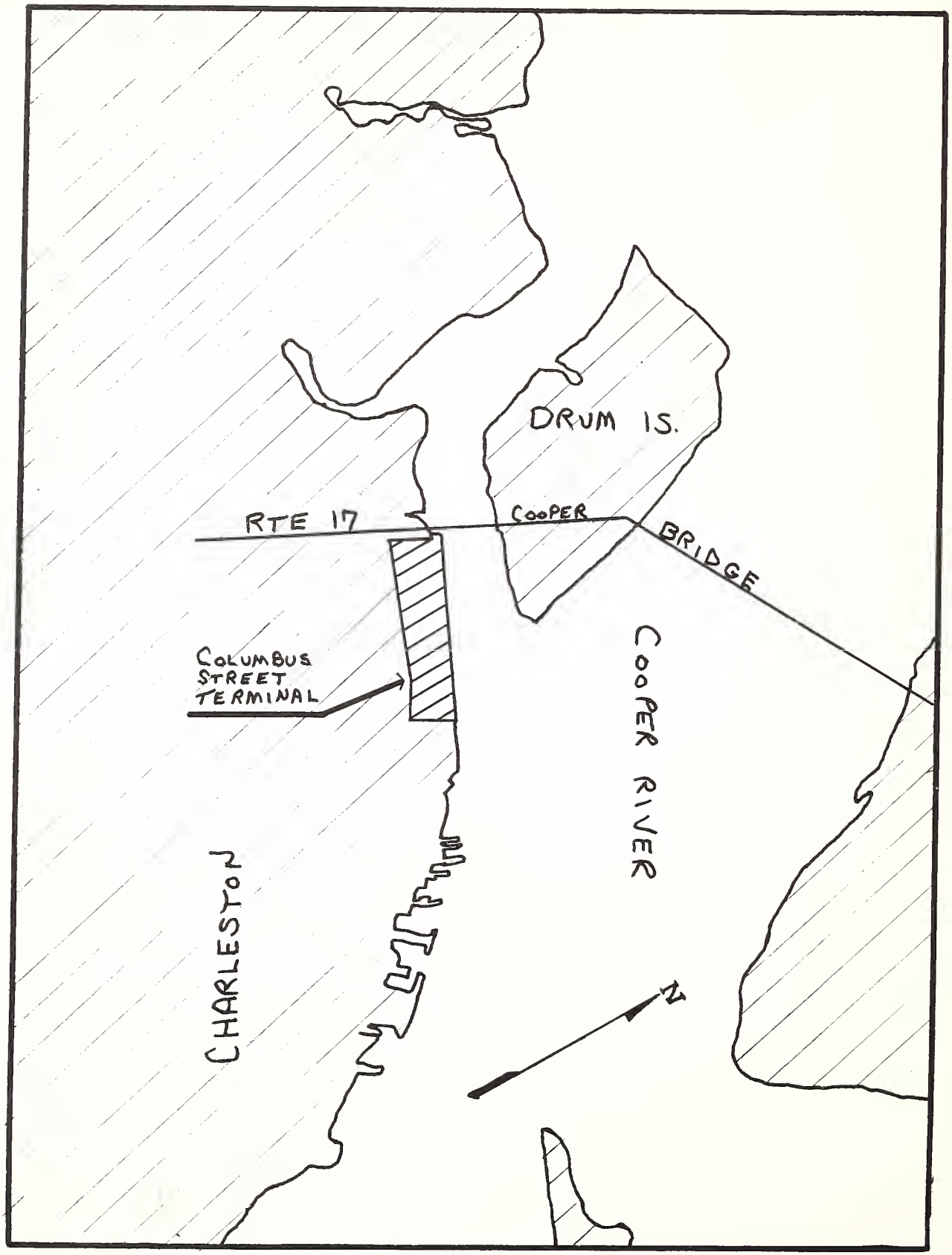
B) One Colby 50-ton gantry crane

C) One Colby 30-ton gantry crane

D) One 90-ton mobile crane

E) Two 50-ton mobile cranes

Also available for service is the largest fixed crane on the East Coast, a 400-long ton capacity unit. To make container operations more efficient, a new custom-built 40-long ton container crane has been installed and is now operational.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Additional flexibility for the on-terminal handling of containers and other heavy lifts is supplied by an 80,000-pound capacity RAGO-WAGNER toplifter. The several stevedoring companies operating at the terminal own and maintain their own smaller, more common cargo handling units such as fork lift trucks and yard commandos.

Approximately eight acres of the Columbus Street Terminal are segregated for the exclusive use of Sea-Land Service. The company's office space, gate complex, stuffing and unstuffing transit sheds, and container storage area, function as a separate fenced in entity apart from the operations of the other vessel operator tenants. Vessel berthing space is not an exclusive use item, but Sea-Land does have a preferential berth option arrangement three days a week. On an average, two of the company's container vessels load and discharge each week, consuming approximately 55 hours of berth time. Transshipment cargo accounts for about 40 percent of the traffic being handled by Sea-Land in Charleston.

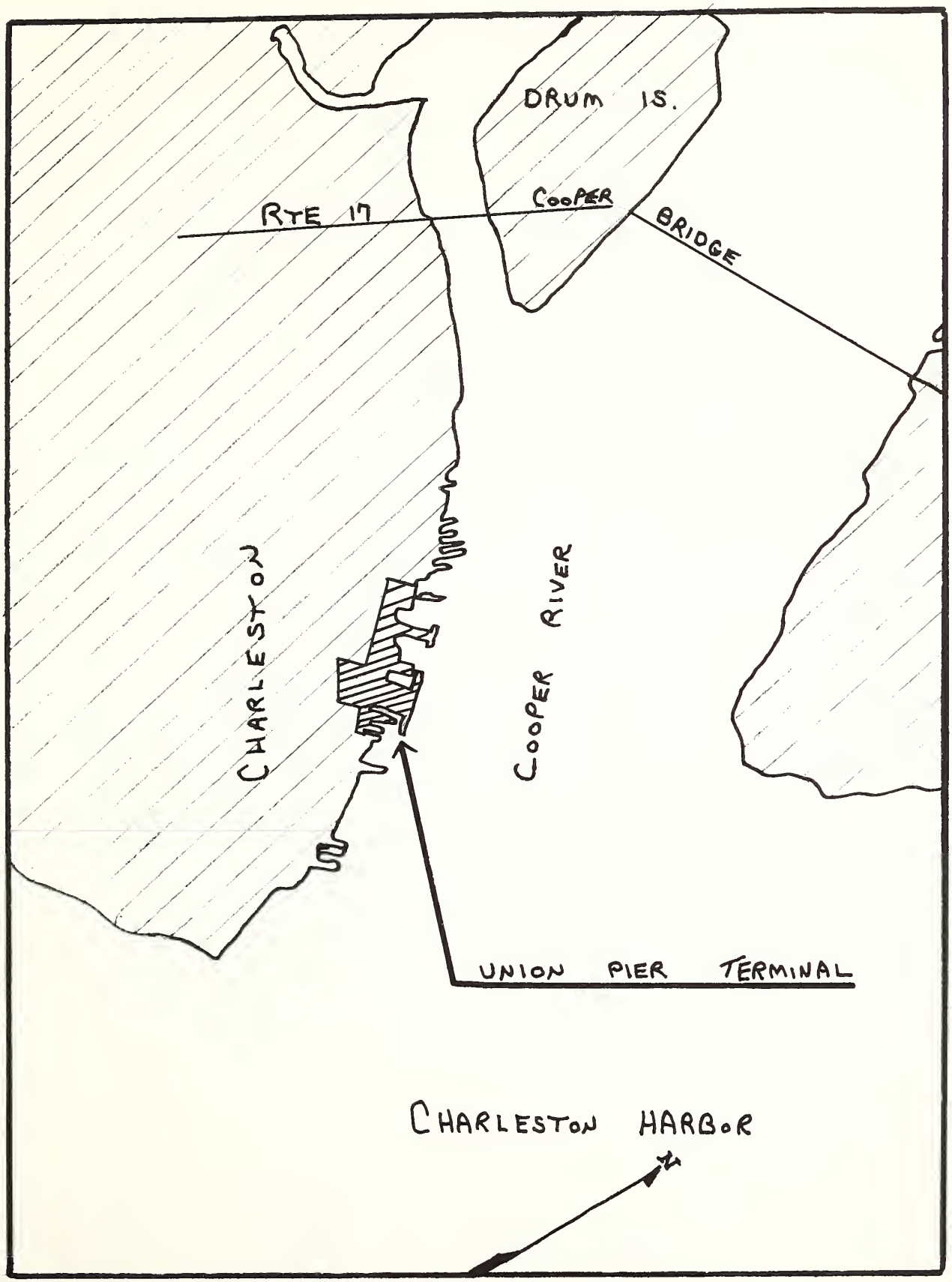
The container storage area arrangement is consistent with the all-mounted yard system policy maintained by Sea-Land.

UNION PIER TERMINAL

Located in the downtown area of Charleston, Union Pier Terminal is an exclusive breakbulk facility. Also known as State Pier 2, the terminal has 1,405 feet of berthing area bordered by a 45 foot apron. Covered warehouse and transit shed space adjoins the apron and totals 256,000 square feet.

Its downtown location makes the terminal somewhat less accessible by vehicular traffic than the port's other marine terminals. Narrower, more congested streets in the downtown area retard the maneuverability of truck traffic. Rail tracks, however, do run into the terminal. The Public Utilities Commission of Charleston provides rail switching service to and from the rail terminals of the two trunk line railroads serving the port.

Major terminal improvements, currently underway, are scheduled for completion in late 1975. They include a 677 foot dock extension with a 67,545 square foot open storage area and a 118,750 square foot transit shed. Adjacent to Union Pier is the recently completed cruise ship terminal, designed to handle 800 passengers per sailing or arrival. The facility is anticipated to increase substantially the volume of cruise vessel traffic calling at Charleston.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CHARLESTON HARBOR

NORTH CHARLESTON TERMINAL

North Charleston Terminal, also known as State Pier 15, has benefited from a $4 million improvement program sponsored by the South Carolina State Ports Authority. It is the port's most modern terminal and is primarily a container facility, although breakbulk cargoes are handled. It is operated as a public terminal by the Port Authority and has among its major tenants:

1) Farrell Lines

2) American President Lines

3) American Export Lines

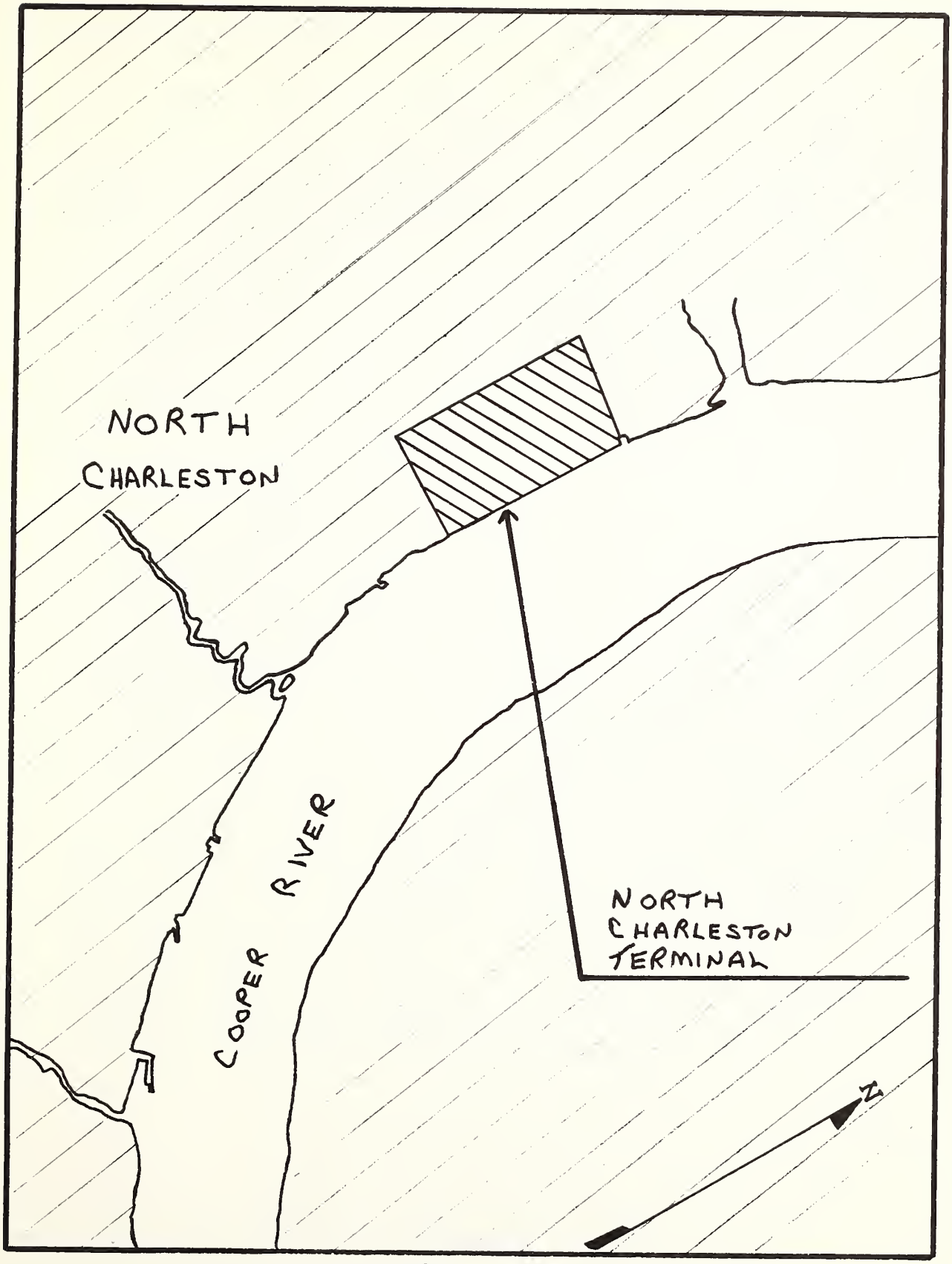
4) Seatrain Lines

5) Orient Overseas Line

The facility is located in the city of North Charleston and, although no major highway is immediately adjacent, vehicular access is very good because of the lack of traffic congestion on the connecting roads leading to Interstate 26, approximately 4.5 miles away.

Rail access, provided through the switching services of the Port Terminal Railroad of South Carolina, is excellent. Tracks onto the terminal connect it with the rail terminal facilities of both the Southern and Seaboard Coast Line Railroads. As with the port's other marine terminals, direct COFC and TOFC service is not offered and drayage is the method of marine container and domestic trailer transfer.

North Charleston Terminal, 172 acres in size, has 2,500 feet of berthing space and one million square feet of covered transit shed and warehouse area. Rail tracks parallel the warehouse wings and ample truck loading bays are available at both the transit shed and warehouse sites. A 600,000 cubic foot cold storage facility is also available and can be serviced by either truck or rail transportation. Another feature of the facility is cargo fumigation, accomplished in three chambers equipped to handle almost any commodity requiring such treatment. A 1.5 million bushel capacity grain elevator is located immediately upstream at a separate berth.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Containers are loaded and discharged from vessels by two 40-long ton rail mounted Star Porter container cranes, each with a 113 foot outreach and 61 foot backreach. Supplementing these cranes is a 35-ton rail mounted gantry crane. Three Rago-Wagner toplifters, one with an 80,000-pound capacity, and two with 70,000-pound capacities, are utilized to handle containers on the 57-acre paved storage area. Back up yard container handling capability is supplied by a 50,000-pound capacity straddle carrier which has both 20-foot and 40-foot unit lifting adaptability. Additionally, the terminal maintains three yard commandos.

Individual contract stevedoring companies provide tenants with cargo handling equipment such as fork lift trucks and yard commandos, with the exception of Seatrain Lines, which operates its own fleet of yard commandos.

Through the security gate entrance, all traffic passes and is routed according to commodity type, its direction of movement (import or export), and the particular steamship operator involved. More than 300 marine containers transit the terminal per week, each of which is subject to physical inspection and weighing upon entrance into and exit from the facility. One truck scale is available for determining individual vehicular unit weights.

RAIL/MARINE INTERCHANGE ANALYSIS

The following major factors must be taken into consideration in analyzing the rail/marine interchange of marine containers in Charleston:

1) Nature of interchange;

2) Interchange procedures;

3) Drayage distance, time, and cost factors.

Other considerations are discussed if they are consistent with the purpose of the report and analysis.

The chart presented earlier in the report showing the relative locations of rail and marine terminals within the port area should be used as a reference for the analysis.

NATURE OF TRANSFER

It should be restated that each of the major trunk line railroads serving the port of Charleston has categorized one or more marine terminals as "ramp locations," meaning that they offer direct delivery of marine containers to those terminals for an additional, but reasonable, charge. The physical transfer of marine containers in the port of Charleston is accomplished through drayage. The reason for this, as mentioned earlier, is the fact that the switching services between rail and marine terminals provided by the South Carolina Public Railways Commission do not include container-on-flatcar or trailer-on-flatcar movements. In some cases, such as the Columbus Street Terminal, the length of the TTX or TTAX railcars would preclude their maneuverability around certain approach turns in the tracks to the marine terminal. These tracks were laid many years ago for use by more conventional-sized railcars.

Operational and economic expediency for the trunk line railroads is another factor favoring drayage as a transfer method. On the operational side, the benefits of not having to transfer custody of costly

railcar equipment to a switching rail operator for multiple day periods are obvious. Loss of rolling stock from a rail system, particularly specialty equipment such as TTX or TTAX cars, is costly in terms of reduced utilization efficiency. On the economic side, the estimated projected trunk line cost per container for rail switching, if such a service were instituted, is in the vicinity of $28. Although less than the average non-volume drayage rate available in the Charleston port area, this charge, combined with the loss of rail equipment for several days, is a less attractive economic package than an exclusive drayage system.

INTERCHANGE PROCEDURES

Rail/marine interchange by drayage is a comparatively simple physical procedure. Contract draymen, acquired by either the railroad to meet its ramp point responsibility or a shipper for his own account, dispatch tractors to either a rail or marine terminal to pick up the marine container. The haul is then made to the destination terminal, where the unit is interchanged to the oncarrier. The paperwork process on each end of the haul is somewhat standard, but can be an area of delay should all the necessary documentation not be in order.

DRAYAGE DISTANCE, TIME, AND COST FACTORS

The following table gives an indication of approximate highway distances between the two rail and three marine terminals discussed in the study.

	Seven Mile Yard (Southern Railway)	Bennett Yard (SCL)
Columbus St. Terminal	8.7 miles	8.0 miles
Union Pier Terminal	9.5 miles	9.0 miles
North Charleston Terminal	4.5 miles	4.0 miles

The time involved in terminal-to-terminal transit is not a major source of delay. Even under adverse conditions of weather or traffic, 30 minutes of running time would be adequate between any particular pair of terminals. Time consumed for the processing of paperwork can be another question. The present volume of traffic is not great enough at any terminal to cause long delays or waiting lines. Paperwork not in order, however, can cause processing delays, and therefore becomes an important consideration in drayage contract agreement.

Predominant among the factors in drayage rate formulation is the aspect of freight traffic volume, a consideration much in evidence in Charleston. High volume container operators in the port can usually supply balanced traffic in each drayage direction, and thus can contract for an approximate $20 charge per unit move. This price reflects greater "power" utilization for the drayage service operator. Other steamship companies, with smaller traffic volumes, are charged an average of $35 per unit each way.

CONCLUSION

The port of Charleston has had a remarkable emergence as a major container port on the East Coast. Due mainly to the establishment and implementation of an ambitious port development plan by the South Carolina State Ports Authority, containerized freight is rapidly approaching the one million tons per year mark.

Despite this rapid growth of containerization in the port, the size and sophistication of the marine terminals are such that there remains much excess container handling capability on a portwide basis. The present volume of container traffic, well below the total port capability, contributes heavily to the present efficiency of the rail/marine interchange in Charleston. Normal traffic peaks and valleys occur depending on vessel sailing schedules, but delays and congestion related to the movement of marine containers create no adverse effect on port commerce.

Additional refinements of terminal receiving, delivery, inspection, and handling procedures are always possible, no matter how efficient present operations are. A continuous effort should be made to attain an increased efficiency status, especially in the area of documentation and the processing of paperwork in general.

The reasons for the selection of drayage as the method of performing container rail/marine interchange have been discussed earlier and they are practical and valid. There are, however, benefits which can be realized from employing a direct rail transfer method of container interchange. With a properly instituted program of direct transfer at marine terminals, factors such as rates, equipment handling, interchange transit times, and port vehicular congestion might be positively affected. In many ports, such a system would be immediately thwarted by the lack of an adequate transfer railway system with trackage into marine terminals. This is not a problem in Charleston where an efficient system does exist and could be adapted for COFC/TOFC transfer directly into marine terminals with less than major physical alterations. Perhaps a long hard look should be taken by port officials at analysis and evaluation of the resulting pro and con findings.

Charleston's development as a container port over the last several years has been impressive and is a tribute to the progressive and competitive ability of the port.

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